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1998

Online at <https://mpra.ub.uni-muenchen.de/63784/>

MPRA Paper No. 63784, posted 21 Apr 2015 18:56 UTC

研究ノート

EXCHANGE RATE MOVEMENTS AND TRADE BALANCES IN SELECTED ASEAN COUNTRIES

Hiroyuki Taguchi

I. Introduction

Since 1996 the East Asian developing countries have entered an adjustment phase, brought on by the sharp slowdown in export growth and sluggish overall economic growth. Some ASEAN countries, especially those with large current account deficits mainly caused by the curbed export growth, have given rise to the tremendous market pressures of currency depreciation. Thailand's currency crisis in July 1997 is the primary example of this phenomenon.

Until 1996 some ASEAN countries had substantially pegged their currencies to a basket of currencies dominated by the U.S. dollar through the intervention of their central banks in the foreign exchange market. It has been argued that, given inflation differentials, such substantial pegging may have entailed appreciation of their currencies in real effective terms, bringing about a drop in international price competitiveness for their countries, and leading to their larger current account deficits in the 1990s.

This article verifies that the exchange rates of the selected ASEAN countries had been overvalued in real effective terms in the 1990-96, and, by estimating export and import functions, implies that the drastic currency depreciation of the sample countries in 1997 may contribute toward recovering their export growth through improvements in their price competitiveness. Section II outlines some general trends in a dual role assigned to exchange rates in a macroeconomic framework. Section III examines recent exchange rate movements and their impact on external balance in the selected ASEAN countries based on several empirical studies.

II. Role of Exchange Rates in a Macroeconomic Framework⁽¹⁾

A. General Trends in Developing Countries

It has long been recognized that "getting the exchange rate right," is an essential condition for achieving macroeconomic stability on a sustained basis. The recent exchange market crises in a number of emerging market countries may suggest a strong need to maintain an appropriately valued currency. In general, the exchange rate performs a dual role in small open economies.⁽²⁾ Its movements can achieve and maintain international competitiveness and so ensure a viable balance of payments. At the same time, a stable exchange rate can anchor domestic prices. A debate has emerged, however,

in both policymaking and academic circles on the relative weight that should be assigned to each of these objectives in formulating exchange rate policy.

Looking at the changing pattern of exchange rate arrangements in developing countries over the past two decades, ensuring a viable balance of payments seems to have been given much more weight than the role as an anchor of domestic price stability.⁽³⁾ Following the breakdown of the Bretton Woods par value system and the widespread adoption of floating exchange rates by the major advanced economies in the early 1970s, most developing countries initially continued to peg their currencies to either a key currency (often the U.S. dollar) or to a basket of currencies.

Starting in the late 1970s, however, a number of developing countries moved away from these arrangements. At first, the shift was mainly away from single-currency pegs to pegs defined in terms of baskets of currencies, for example the SDR, or to limited flexibility with respect to a single currency. But since the early 1980s, there has been a marked shift toward more flexible exchange rate arrangements. Thus, whereas in 1975, 87 percent of developing countries had some type of pegged exchange rate (only 10 percent had flexible exchange rates), by the mid-1990s most countries had reportedly adopted a flexible exchange rate regime.⁽⁴⁾

B. Factors Underlying the Shift of Weight Assigned to Role

Role as Anchor of Price Stability

Since the 1970s, many developing countries have faced situations involving persistently high inflation, large fiscal deficits, rapid monetary expansion, a deteriorating balance of payments position, and a crisis of confidence among both domestic and foreign investors. In addressing these difficulties, policymakers have often sought to bring about the necessary adjustments through exchange-rate-based stabilization programs. The decision to use the exchange rate as a nominal anchor instead of monetary targets has often been influenced by the belief that the adoption of a visible anchor would enhance the credibility of the program. It has been argued that by pegging the exchange rate to a low-inflation currency, inflation would be brought down rapidly because the traded goods component of the price level would stabilize, through the attendant restraint imposed on wage and price-setting behavior, and through the restraint imposed on aggregate demand, especially government spending.

Some of the major exchange-rate-based stabilization programs in chronically high inflation countries were undertaken in Latin America, such as the program in Chile (1978), Uruguay (1978), Argentina (1991), and Mexico (1987). Some of these were "orthodox" programs in which the exchange rate was the sole nominal anchor, while others were "heterodox," where the exchange rate was supplemented by wage and price controls. These programs more or less achieved significant success in bringing down inflation, with the case of Mexico being a typical example where inflation was brought down by over a third in the first year of the program, from an annual rate close to 160 percent. Furthermore, in almost all of the successful programs, public-sector deficits were sharply reduced within the first two years of the program. In economies experiencing very high inflation or hyperinflation, extensive "dollarization" increased the attractiveness of the exchange rate as the nominal anchor in stabilization.

Repercussions from Achieving the Anchor Role

Paradoxically, the very forces that were behind the success of these exchange-rate-based stabilization programs in reducing inflation and imposing policy discipline eventually put enormous strain on the pegs, and ultimately led to their abandonment. In order to signal the authorities' commitment to disinflate or to sustain a low rate of inflation, the nominal exchange rate was either kept fixed or allowed to depreciate at a rate less than the differential between the rate of domestic inflation and the inflation rate of the country to whose currency the exchange rate was pegged. However, this necessarily entailed a real appreciation of the currency over time. Indeed, in most of the exchange-rate-based stabilization programs the real exchange rate appreciated considerably over several years. This appreciation, in turn, caused the current account position to worsen.

Typically in these cases, the large current account deficits that arose were initially financed by increased capital inflows that were attracted by the restoration of investor confidence, higher interest rates, and the expectation that at least for the near future the nominal anchor would remain in place. In many of these countries, however, investors soon came to perceive that the twin problems of continued current account deficits and real exchange rate appreciation could not continue, and that the peg would be abandoned in favor of devaluation. This contributed to a sudden reversal of capital inflows triggering balance of payments crises that eventually resulted in a further round of exchange rate devaluations, fulfilling market expectations.

Trend Toward Flexibility

The initial factor that induced shifts out of pegged exchange rate arrangements toward more flexible ones was a series of external shocks in the 1980s, including the steep rise in international interest rates, the slowdown of growth in the industrial countries, adverse terms of trade movements, and debt crises. These external shocks required real exchange rate depreciations in a number of developing countries and, hence, greater flexibility in exchange rate policy.

The trend toward increased exchange rate flexibility reflects many instances in which countries faced balance of payments difficulties. For instance, between 1985 and 1992, all countries that shifted to "independently floating" did so in response to severe balance of payments difficulties, and most did so as a prior action in the context of an IMF programs.⁽⁵⁾ This trend is consistent with the facts that countries with pegged regimes have until recently experienced losses of competitiveness relative to countries with officially declared more flexible exchange rate arrangements, and thereby have tended to run larger current account deficits than countries whose currencies have been more flexible. On average, the real effective exchange rates in 1996 of countries with single-currency pegs were essentially unchanged from 1980, while currencies pegged to a basket had depreciated in real effective terms by a cumulative 14 percent, and countries with flexible exchange rates fell by 55 percent over the same period.⁽⁶⁾

The increased preference for greater exchange rate flexibility has also been associated with increasing international financial integration and, in some respects, increased potential instability. When countries are faced with large capital inflows and a risk of overheating, a more flexible exchange rate may help alleviate pressures associated with capital inflows, and will also help provide an early signal of the possible need for domestic policy adjustments, thereby helping to contain the external imbalances.⁽⁷⁾

Role in External Adjustment

The inevitability of adopting a flexible exchange rate arrangement in a range of external circumstances does not necessarily mean that a flexible exchange rate can play a significant role in external adjustment. One of the important conditions to measure the effectiveness of exchange rate on external adjustment is called the Marshall-Lerner condition. It states that, all other things being equal, a real depreciation of a country's currency improves its current account if export and import volumes are sufficiently elastic with respect to the real exchange rate, precisely if the sum of the relative price elasticities of export and import demand exceeds 1 when the current account is initially zero.⁽⁸⁾

The question is whether empirical estimates of trade equations imply price elasticities consistent with the condition. There have been several empirical studies that satisfy the Marshall-Lerner condition, at least over the long run. Goldstein and Khan (1985) provided a survey for the results from this line of work and summarized that changes in relative prices have a significant impact on trade volumes and the nominal trade balance. A recent study on estimates of real exchange rate elasticities has been carried out by Ito, Isard, Symansky, and Bayoumi (1996). The results indicate that, for the average APEC economy, a sustained 1 percent depreciation in the real exchange rate reduces import volumes by about one-half of 1 percent and raises real exports by about three quarters of 1 percent. These responses are sufficiently large to ensure that the current account improves. Although the improvement become apparent only after a year or two with the impact on trade volumes increasing significantly over time, this recent study presents solid evidence that satisfies the Marshall-Lerner condition.

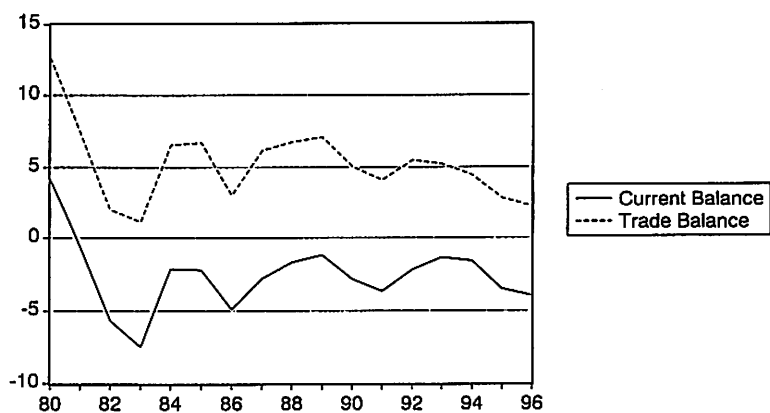
III. Evidence from Selected ASEAN Countries

We now extend the previous empirical study of Ito, Isard, Symansky, and Bayoumi (1996) to the recent cases in the current account deficit-bearing ASEAN countries. We focus on the ASEAN countries of Indonesia, Malaysia, the Philippines, and Thailand, all of which have faced a larger current account deficit since the 1990s. We will first outline some recent trends in the sample countries, and then examine their exchange rate movements⁽⁹⁾ and their impacts on trade balances in the 1990s.

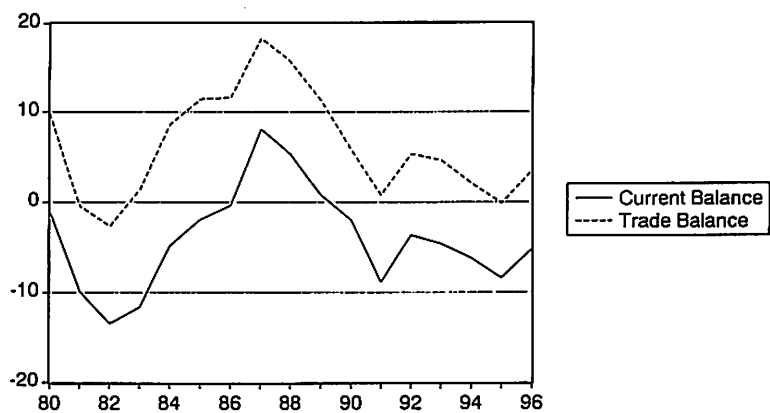
A. Recent Economic Trends and Trade Balances

In the first half of the 1990s, the sample countries performed well in terms of robust economic growth and moderate inflation. During this period, their current account deficits expanded, but these deficits seemed to be financed by foreign capital inflows in a sustainable way. Since 1996, however, they have entered an adjustment phase, brought on by a sharp slowdown in export growth and by sluggish overall economic growth. Their larger current account deficits, directly caused by the curbed export growth, have given rise to the devastating market pressures of currency depreciation. Thailand's currency crisis in July 1997 is the primary example here.

Recent trends of current account balances have almost corresponded to those of trade balances. The enlarged current account deficits in the 1990s have mainly been created by the increases in trade deficits in the Philippines and Thailand, and by the decreases in trade surpluses in Indonesia and Malaysia, during the same period (Figure 1).

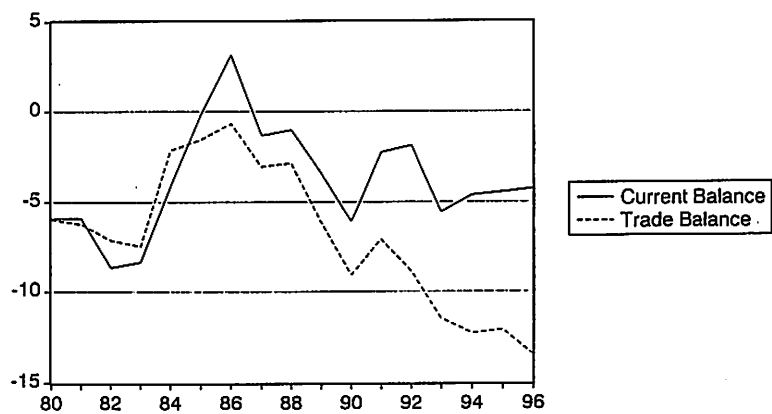
Figure 1 - a External Balance in Indonesia (% of GDP)

SOURCES: IMF (1997 b), ADB (1997 a), and ADB (1997 b).

Figure 1 - b External Balance in Malaysia (% of GDP)

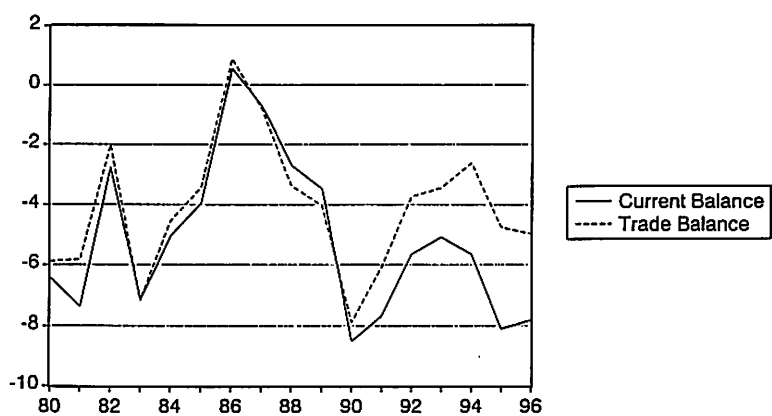
SOURCES: IMF (1997 b), ADB (1997 a), and ADB (1997 b).

Figure 1 - c External Balance in Philippines (% of GDP)



SOURCES: IMF (1997 b), ADB (1997 a), and ADB (1997 b).

Figure 1 - d External Balance in Thailand (% of GDP)



SOURCES: IMF (1997 b), ADB (1997 a), and ADB (1997 b).

B. Exchange Rate Movements, 1980-96

After the sample countries carried out a devaluation of the exchange rate as one of their structural adjustment package in the 1980s, they had maintained stable levels or trends in exchange rates against the U.S. dollar until 1996. This is because they had substantially pegged their currencies to a basket of currencies dominated by the U.S. dollar through the intervention of their central banks in the foreign exchange market, regardless of the official classification of their exchange rate arrangement.⁽¹⁾ The question is whether such substantial pegging may have entailed appreciation of their currencies in real effective terms given inflation differentials, bringing about a setback in international price competitiveness for their countries in the 1990s.

Nominal and Real Exchange Rates

We first show the movements of both nominal and real exchange rates in bilateral terms. We selected the U.S. dollar, Japanese yen, and Chinese yuan as a partner's currency of each sample country, because the United States and Japan are their major trade partners, and the People's Republic of China (China), though not a major trade partner, seems to be in a competitive position against the sample countries in export markets thanks to its large share in world trade.

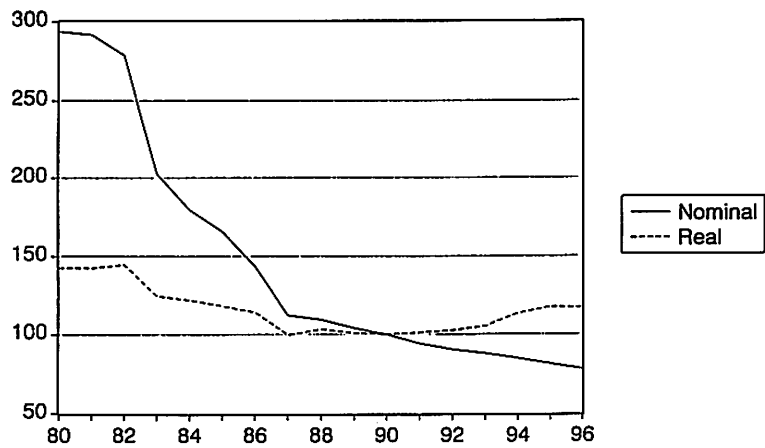
While the nominal exchange rate is the relative price of two currencies, the real exchange rate between two countries' currencies is a summary measure of the prices of one country's output baskets relative to the other's. We can express, for example, the real U.S. dollar/Indonesian rupiah exchange rate ($RER_{\$/Rph}$) as the U.S.-dollar value of Indonesia's price level divided by the U.S. price level. In symbols this would be

$$RER_{\$/Rph} = (ER_{\$/Rph} * P_{Rph}) / P_{US}$$

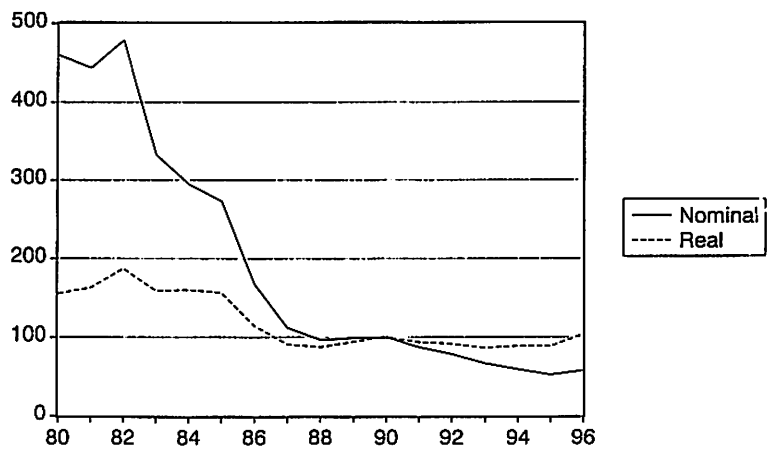
where $ER_{\$/Rph}$ is the nominal U.S. dollar/Indonesian rupiah exchange rate, P_{Rph} is Indonesia's price level, and P_{US} is the U.S. price level.⁽¹⁾ In this calculation, we need to clarify the price-level measure we will be using. Since we will soon link our analysis to the factor of trade determination, we use the wholesale price index⁽²⁾, which has a greater weight on tradable goods than does the consumer price index.

Figure 2 describes some trends over the period of 1980-96 of bilateral exchange rates of the sample countries in both nominal and real terms. The following are the main findings.

1. As for the exchange rates against the U.S. dollar, the real exchange rates of all the sample countries show appreciation in the 1990s, while the nominal exchange rates depreciate or almost level off over the same period. This stems from the higher inflation in the sample countries than that of the

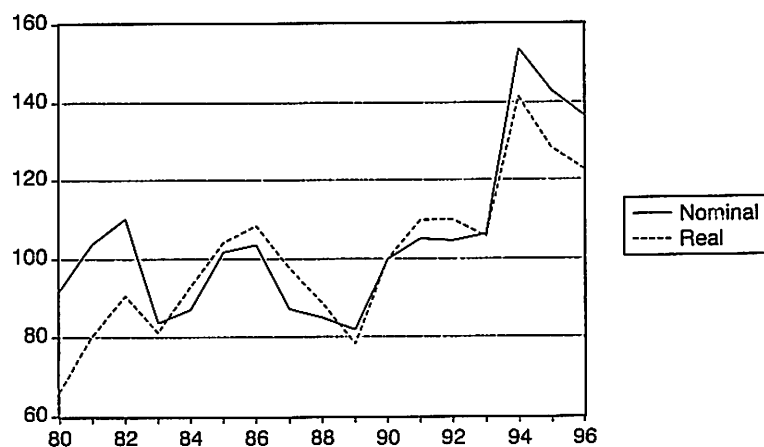
Figure 2 - a - i Exchange Rates: \$/Rph (1990=100)

SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - a - ii Exchange Rates: Yen/Rph (1990=100)

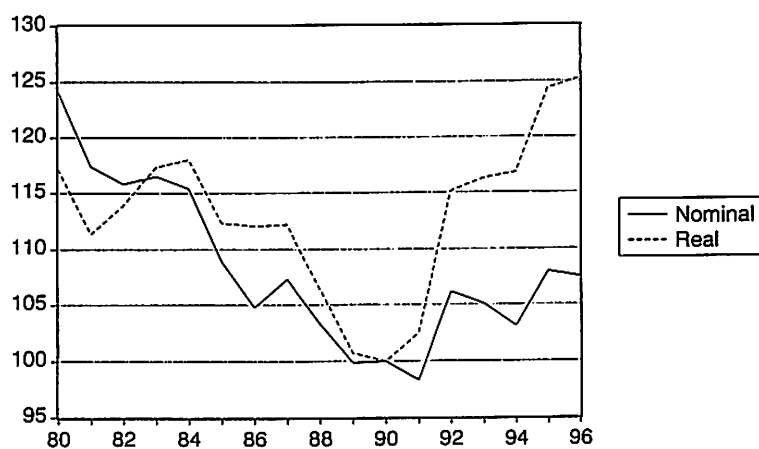
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - a -iii Exchange Rates: Yuan/Rph (1990=100)



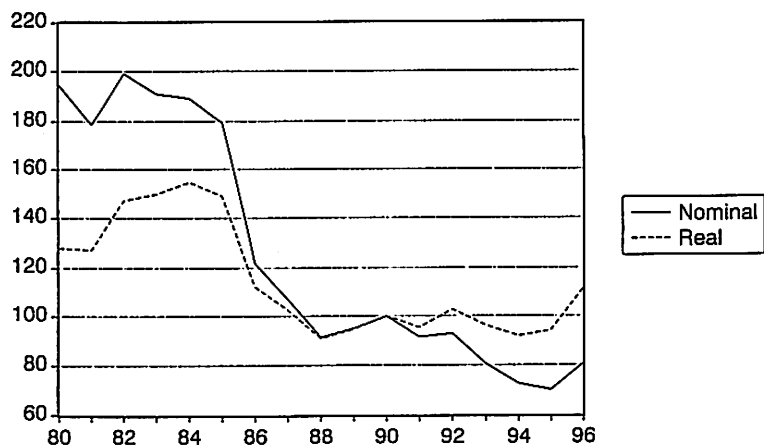
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - b -i Exchange Rates: \$ /Ringgit (1990=100)



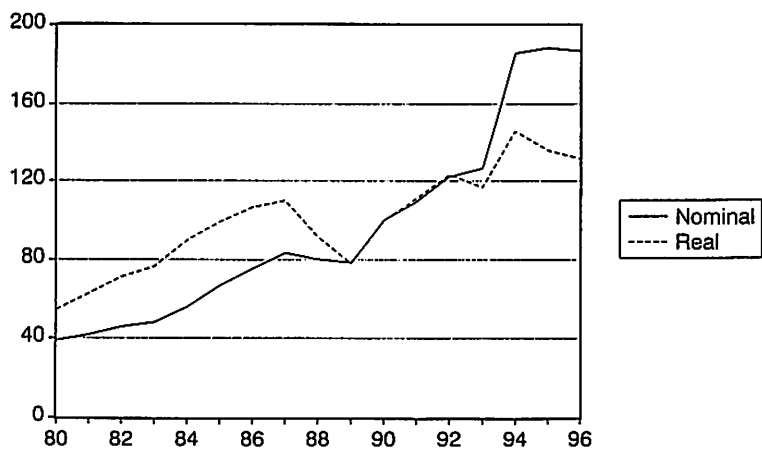
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - b - ii Exchange Rates: Yen/Ringgit (1990=100)



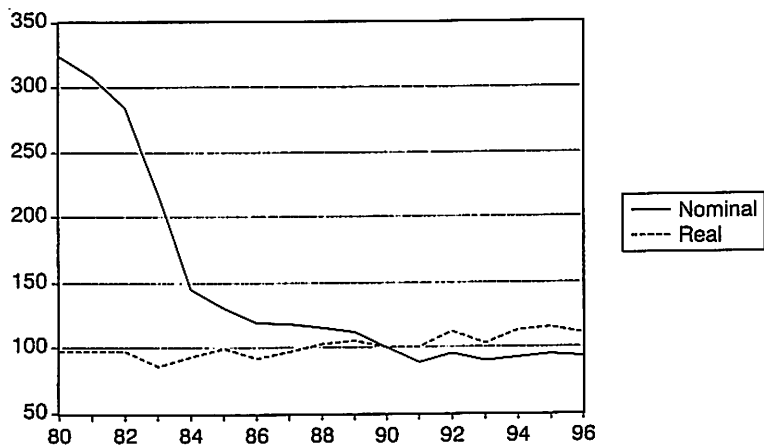
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - b - iii Exchange Rates: Yuan/Ringgit (1990=100)



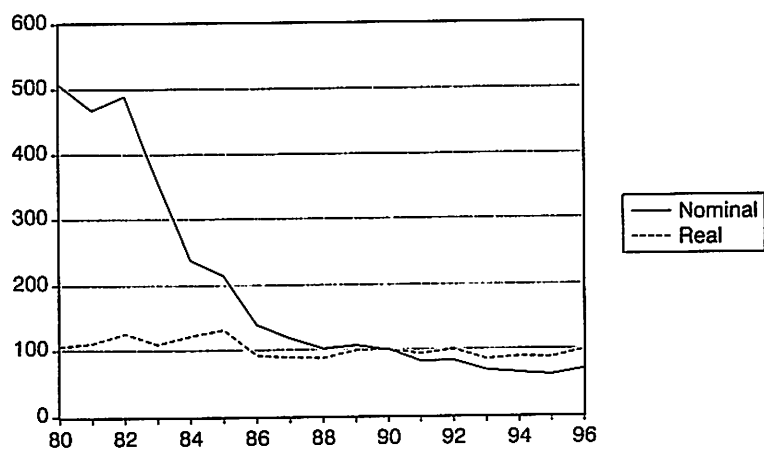
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - c - i Exchange Rates: \$/Peso (1990=100)



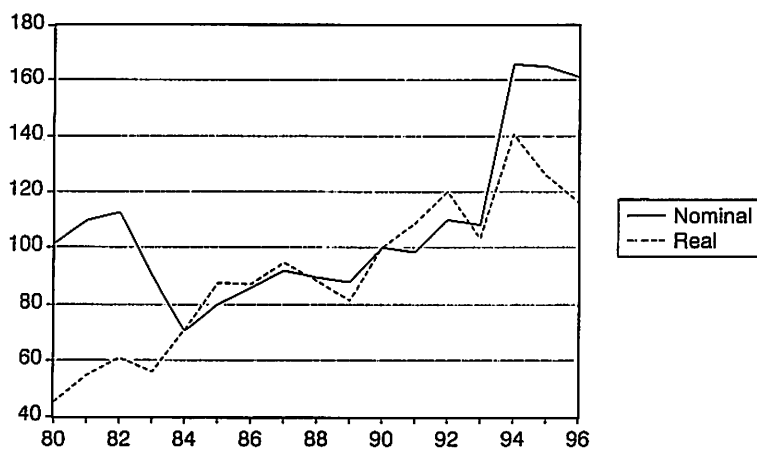
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - c - ii Exchange Rates: Yen/Peso (1990=100)



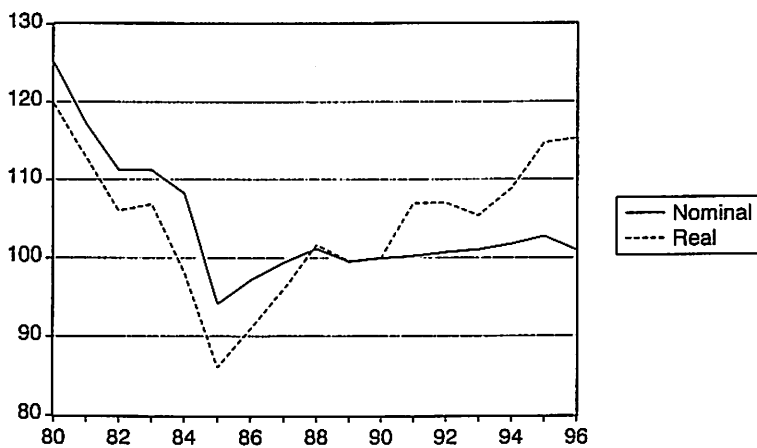
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - c - iii Exchange Rates: Yuan/Peso (1990=100)



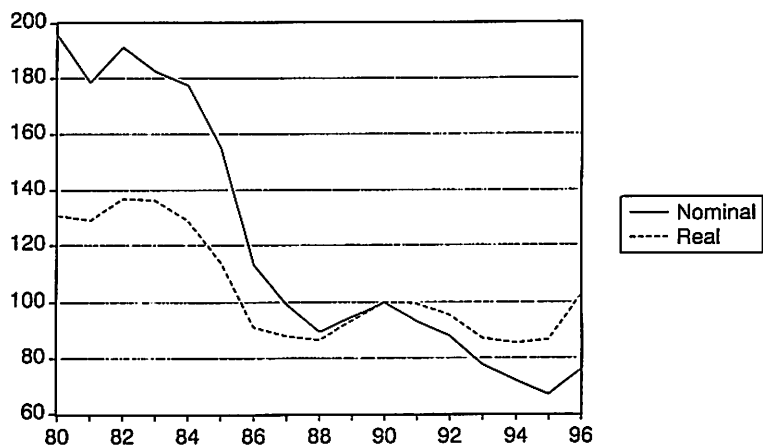
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - d - i Exchange Rates: \$/Baht (1990=100)



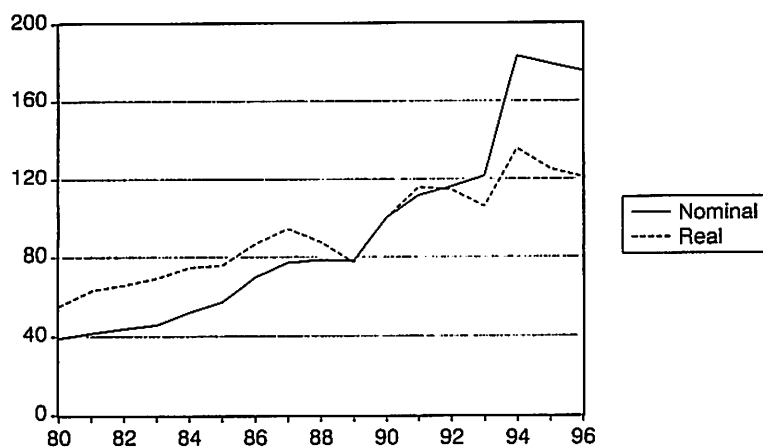
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - d - ii Exchange Rates: Yen/Baht (1990=100)



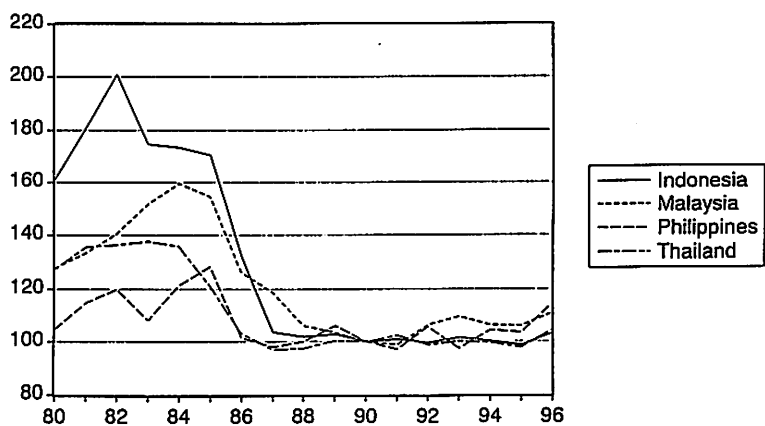
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 2 - d - iii Exchange Rates: Yuan/Baht (1990=100)



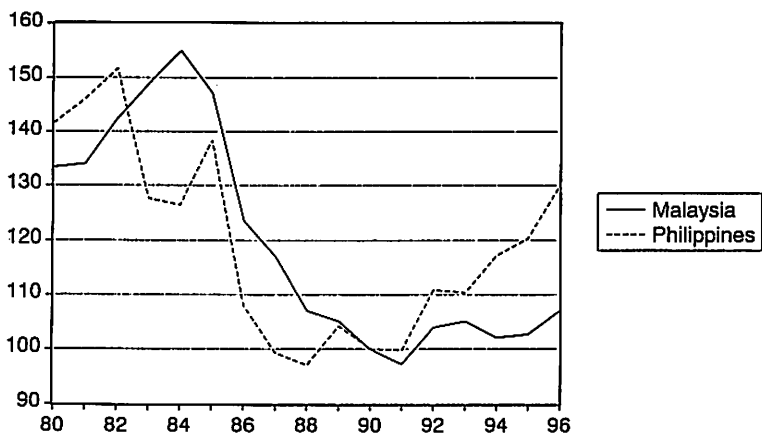
SOURCES: IMF (1997 b) and ADB (1997 b).

Figure 3 Real Effective Exchange Rates
by Morgan Guaranty Index (1990=100)



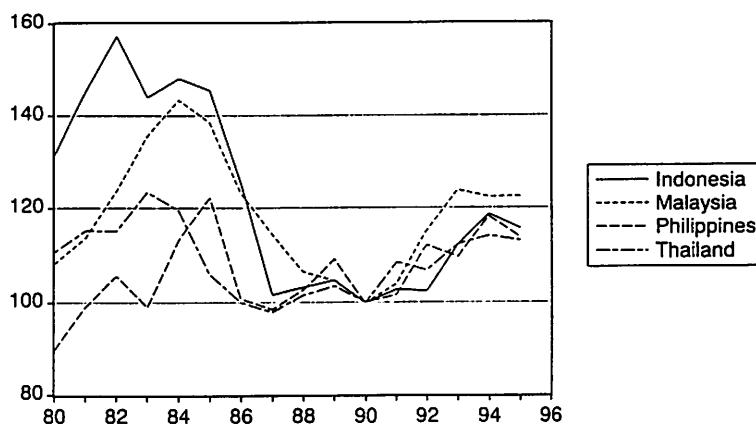
SOURCES: Morgan Guaranty Index

Figure 4 Real Effective Exchange Rates
by International Monetary Fund (1990=100)



SOURCES: IMF (1997b).

Figure 5 Real Effective Exchange Rates
Based on World Export Unit Price (1990=100)



SOURCES: IMF (1997b)

United States.

2. As for the exchange rates against the yen, the nominal exchange rates show trends of depreciation, reflecting the high appreciation of the yen until 1995. The real exchange rates, however, do not depreciate so much until 1995 and turn into rapid appreciation in 1996, reflecting the depreciation of the yen.
3. As for the exchange rates against the yuan, both nominal and real exchange rates indicate high appreciation in 1994, reflecting the drastic devaluation of the yuan. The real exchange rates, however, do not appreciate so much because of the higher inflation in China than in the sample countries.

Real Effective Exchange Rates

We next need to unify the bilateral real exchange rates to obtain a single indicator for the international price competitiveness of each sample country. The real effective exchange rate (REER) is a measure for this use. We can express, for example, the REER of the Indonesian rupiah as the weighted geometric average of bilateral real exchange rates, or, in symbols, as

$$REER_{Rph} = W_{US} * RER_{\$/Rph} + W_{JP} * RER_{Yen/Rph} \dots (W_{US} + W_{JP} + \dots = 1)$$

where W_{US} , W_{JP} , ... are the weights attached to each bilateral real exchange rate. We then need to specify the weights.

The Morgan Guaranty indexes on REER ($REER_{MGI}$) are weighted averages of each country's exchange rate with its trading partners wherein the weights are the share of the trading partner in the country's total exports and imports.⁽¹³⁾ Figure 3 shows the trends over the period of 1980-96 of REERs by the Morgan Guaranty indexes. We observe that not all of the REERs necessarily show a clear

trend after the drastic depreciations in 1986-87. This observation may not, by definition, be consistent with the argument that pegging exchange rates may have entailed appreciation of currencies in real effective terms. This may be because the Morgan Guaranty indexes do not fully reflect the role of competitors in export markets, with the drastic devaluation of the yuan in 1994 being the typical example.

The IMF weighting scheme is based on trade data for manufactured goods and primary goods, with weights reflecting both the relative importance of a country's trading partners in its direct bilateral trade relations, and that resulting from competition in third markets.⁽¹⁴⁾ However, the REER compiled by the IMF based on this weighting scheme ($REER_{IMF}$) is not available except for Malaysia and the Philippines, which have a comparatively clear trend of appreciation in the 1990s (Figure 4).

The alternative way to unify the bilateral real exchange rates is to divide the U.S. dollar value of the price level⁽¹⁵⁾ of a country in question by the U.S. dollar value of the world export unit price index. This indicator ($REER_{EUP}$) is intended to denote price competitiveness; the prices of one country relative to those of the competitors in the world export markets. In Figure 5, we observe that the $REER_{EUP}$ s of the sample countries show a trend of appreciation in the 1990s. This trend is consistent with the argument that pegging exchange rates may have recently entailed appreciation of currencies in real effective terms.

C. REER and Trade Balances

The next question concerns the relationship between exchange rate movements and trade balances in the sample countries. We first specify export and import functions, with the REERs being one of the independent variables, and examine the impacts of the REER's movements on trade balances by observing the REER's elasticities.

Specification on Export and Import Functions

The movement of exchange rates has played a central role in empirical work on trade, where volumes of exports and imports are usually related to changes in relative prices and to changes in real activity either at home (for imports) or abroad (for exports). Such equations have proven to be highly successful empirically, and they have consistently been used in policy work and in macroeconomic models.⁽¹⁶⁾

The ordinary export and import functions are specified into the following forms:

$$EXR = \alpha_X REER + \beta_X WYR$$

$$IMR = \alpha_M REER + \beta_M DYR$$

where EXR , IMR , WYR , and DYR represent real exports, real imports, industrial-country real GDP, and domestic real GDP, respectively.⁽¹⁷⁾ Since the data for real exports and real imports of the sample countries are not always available for recent years, we here rewrite the above functions for regression in following forms:

$$EX/DY = \alpha_X REER + \beta_X WYR$$

Table 1 Results from Regressions of Export and Import Function

(1) Export Function

(i) The case of using REER of International Monetary Fund

	WYR _t	REER _{t-1}	RR	AR(1)	D. W.	Sample
Malaysia	0.890***	-0.181***	0.96	YES	1.73	1982-96
Philippines	0.217***	-0.019	0.83	YES	1.64	1982-96

(ii) The case of using REER based on World Export Unit Price

	WYR _t	REER _{t-1}	RR	AR(1)	D. W.	Sample
Indonesia	0.257***	-0.062***	0.89	NO	1.84	1981-96
Malaysia	0.913***	-0.194**	0.94	YES	1.63	1982-96
Philippines	0.244***	-0.045	0.83	YES	1.67	1982-96
Thailand	0.434***	-0.150***	0.92	YES	2.00	1982-96

(2) Import Function

(i) The case of using REER of International Monetary Fund

	DYR _t	REER _{t-1}	RR	AR(1)	D. W.	Sample
Malaysia	0.535***	0.024	0.86	YES	1.34	1982-96
Philippines	0.463***	-0.001	0.93	YES	2.53	1982-96

(ii) The case of using REER based on World Export Unit Price

	DYR _t	REER _{t-1}	RR	AR(1)	D. W.	Sample
Indonesia	0.090**	0.067*	0.26	YES	1.10	1982-96
Malaysia	0.545***	0.009	0.86	YES	1.35	1982-96
Philippines	0.463***	-0.004	0.93	YES	2.54	1982-96
Thailand	0.211***	0.087	0.81	YES	1.32	1982-96

Notes:

(1) The specified Export and Import Function is:

$$EX_t/DY_t = a_x REER_{t-1} + b_x WYR_t$$

$$IM_t/DY_t = a_m REER_{t-1} + b_m DYR_t$$

EX: Nominal Merchandise Exports (Indonesia: Exclude Oil Exports)

IM: Nominal Merchandise Imports

DY: Domestic Nominal GDP

DYR: Domestic Real GDP

WYR: Industrial-country Real GDP

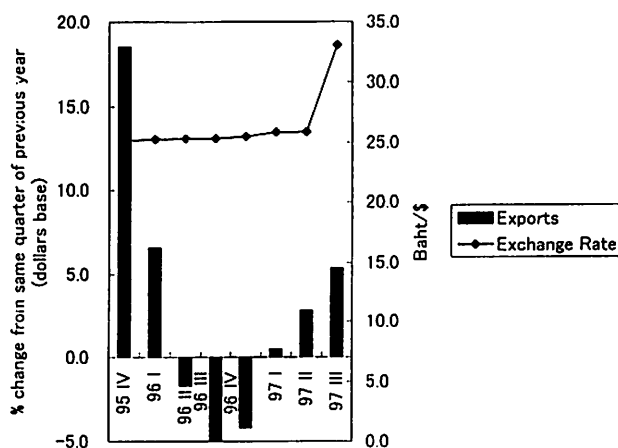
(2) One, two, and three asterisks indicate that the coefficient is significant at the 10, 5, and 1 percent levels, respectively.

(3) RR: Adjusted R-squared.

(4) AR(1): Adjusted for Autocorrelation by adopting Cochrane-Orcutt procedure.

Sources: IMF (1997b) and ADB (1997b).

Figure 6 Recent Exports in Thailand



Sources: Japanese Economic Planning Agency, "Overseas Economic Data," Dec. 1997

$$IM/DY = \alpha_M REER + \beta_M DYR$$

where *EX*, *IM*, and *DY* represent nominal exports, nominal imports, and domestic nominal GDP, respectively.

Impacts of REER's Movements on Trade Balances

Table 1 reports the results of the regressions using ordinary least squares on the specified export and import equations of the sample countries based on annual data on each variable from 1980 through 1996. In these regressions, we use the lagged values of the REERs because the response of trade volumes to changes in the REERs builds more gradually over time. As the index of REER, we use $REER_{IMF}$ and $REER_{EUP}$, which show a clear trend of appreciation in the 1990s.

The following are the main observations from the regressions.

1. The elasticities on activity (*WYR* or *DYR*) for both exports and imports are large and highly significant.
2. In either case of using $REER_{IMF}$ or $REER_{EUP}$, the elasticities on the REER for exports are significant in the sample countries except for the Philippines, but those for imports are insignificant or incorrectly signed except for Indonesia.

These observations imply that REER changes appear to have significant effects, at least on exports. In this sense, the drastic currency depreciation of the sample countries in 1997 may contribute toward recovering their export growth through improvements in their price competitiveness.¹⁸ In fact, we can see recent export growth in Thailand which experienced earlier currency depreciation (Figure 6). As for the elasticities on the REER for imports, the lack of precision may come from the impact of factors such as changes in trade policy or shifts in the type of imported goods. Especially, rapid progress in trade liberalization such as tariff reduction since the late 1980s in the sample countries may

have produced an upward trend of their merchandise imports regardless of exchange rate movements. This point, anyway, needs further empirical studies, including the measurement of REER.

V. Concluding Remarks

In general, the exchange rate performs a dual role in small open economies: as an anchor of domestic price stability, and in external adjustment. Looking at the changing pattern of exchange rate arrangements in developing countries over the past two decades, ensuring a viable balance of payments seems to have been given much more weight than the role as an anchor of domestic price stability. When inflation was high, a pegged exchange rate often proved a more suitable anchor for bringing inflation down efficiently, at least in the short run. Once stabilization is achieved, however, countries have preferred to shift toward a more flexible regime to alleviate their balance of payments difficulties. Furthermore, there have been several empirical studies on the effectiveness of exchange rates on external adjustment in terms of the Marshall-Lerner condition.

In this article, we have examined some recent exchange rate movements and their impact on the external balances in the selected ASEAN countries based on several empirical studies.

The main findings and their implications are twofold. While Morgan Guaranty's REERs ($REER_{MGI}$) – the relative prices against trading partners – do not necessarily show a clear trend, the $REER_{IMF}$ and $REER_{EUP}$ – the relative prices against the world competitors – do show a trend of appreciation. When the role of competitors is taken into account, pegging exchange rates may have entailed appreciation of currencies in real effective terms. Moreover, the elasticities on the REER for exports are well determined. This observation implies that the drastic currency depreciation of the sample countries in 1997 may contribute toward recovering their export growth through improvements in their price competitiveness. The recent export growth in Thailand seems to be one of the symptoms.

Several issues still remain for the consideration of the impact of currency depreciation on external balance. We pick up two main issues among these. First, we may improve the specification of export and import functions by taking lagged structure into account. It enables the impact of currency depreciation to be divided into long-run effect and short-run one. Second, we have to consider "general impact" in addition to "partial impact" of exchange rate movement. A typical example is that this study treated domestic real GDP as exogenous variable. However, the domestic real GDP is also influenced by currency depreciation. Furthermore, the adverse effects from such variables as interest rate to exchange rate may have to be considered under floating exchange rate system in comprehensive framework.

NOTES

- (1) The descriptions in this section mostly refer to International Monetary Fund (1997a), Chapter IV.
- (2) See Aghevli, Khan, and Montiel (1991).
- (3) The theoretical issues on the choice of exchange rate regime, such as the theory of optimum currency area, are beyond the capacity of this paper. For reviews of the literature see Aghevli, Khan, and Montiel (1991) and Isard (1995).
- (4) See International Monetary Fund (1997a). As we see later in Section III, in some countries an arrangement may be officially classified as "flexible," even though they continue to informally peg their exchange rate to one

of the major currencies. In this sense, the shift toward more flexible exchange rate regimes since the 1970s may therefore be less pronounced than indicated by official statements and classifications.

- (5) See Quick (1994).
- (6) See International Monetary Fund (1997 a).
- (7) It must be noted that regardless of the exchange arrangement, macroeconomic policies need to support the arrangement to ensure its success. Even in countries that accept a high degree of exchange rate flexibility, there is a need to pay considerable attention to exchange market conditions, and for policy adjustments and official intervention to help avoid excessive volatility and serious misalignment.
- (8) For details on the Marshall-Lerner condition see Krugman and Obstfeld (1994).
- (9) In looking at the relationship between exchange rates and trade, it is useful to distinguish between the effects of day-to-day exchange rate volatility and more persistent movements in the exchange rate. In this paper, the focus is on the latter impact of the exchange rate. Ito, Isard, Symansky, and Bayoumi (1996) assess the impact of both types of exchange rate behavior on trade within the APEC region.
- (10) "Exchange Rate Arrangements" in the International Financial Statistics of the IMF classifies the exchange rate arrangements of individual member countries into "pegged," "limited flexibility," and "more flexible." The classifications reflect judgments by the IMF staff on the basis of the information obtained from member countries. According to the classification as of March 31, 1997, Indonesia and Malaysia are classified into "managed floating" in "more flexible," the Philippines into "independently floating" in "more flexible," and Thailand into "pegged" to various baskets of currencies of the members' own choice.
- (11) All the indexes on exchange rates in this section are expressed as the foreign currency price of a unit of domestic currency. Thus, an increase in the index is associated with appreciation of the currency in question.
- (12) In case of Malaysia we use the consumer price index because of the constraint of data availability. The use of the wholesale price index can be viewed as a compromise between using broader price indexes, such as those for GDP and consumer expenditures, which include many nontraded goods – particularly services – and a narrow index based on export or import prices that may be too reflective of the global market. The positive relationship between economic growth and real appreciation is often assumed to arise from a tendency for productivity growth in the tradable goods sector to outpace that in the nontradables sector, especially as the economy's overall productivity growth gains speed. Such real appreciation, however, does not necessarily entail any loss of competitiveness in terms of traded goods prices. This phenomenon is generally referred to as the Balassa-Samuelson effect. See Balassa (1964).
- (13) See Morgan Guaranty (1983, 1986).
- (14) In the IMF scheme, the real effective exchange rate index is derived from the nominal effective exchange rate index, adjusted for relative changes in consumer prices. The weights, which are derived from MERM (Multilateral Exchange Rate Model), each represent the model's estimate of the effect on the trade balance of the country in question of a 1 percent change in the domestic currency price of each of the other currencies, taken one at a time. A detail description of the method is contained in the IFS *Supplement on Exchange Rates*, No. 9 (1985).
- (15) We here use wholesale price index in stead of export unit price index because of the constraint of data availability.
- (16) Much of trade theory, including the factor-proportions theory associated with Heckscher and Ohlin, focuses on the underlying reasons for international trade, with relatively limited discussion of the role of exchange rates either in determining or being determined by trade. In contrast to that, exchange rates have played a central role in estimated equations for trade volumes. See Ito, Isard, Symansky, and Bayoumi (1996).
- (17) These types of equations are not without critics. The most important concern centers on whether supply terms should also be included in the equations for export volumes. According to Ito, Isard, Symansky, and Bayoumi (1996), estimates of price elasticities using supply terms in export equations are generally similar to those produced by traditional export equations.

- (18) The nominal exchange rates of the sample countries against the U.S. dollar have depreciated by 20-30 percent from the average of 1996 to the level as of November, 1997. It does not necessarily mean the depreciation of REER by the same degree, partly because nominal exchange rate movements cause offsetting movements in domestic prices.

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